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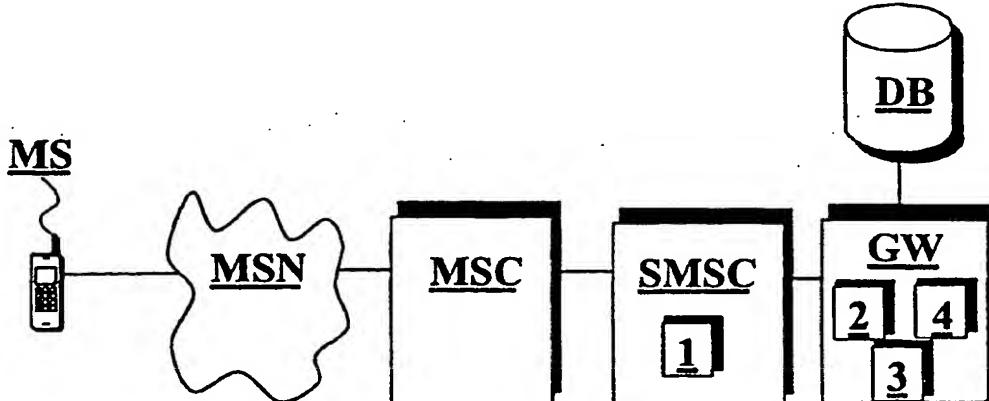
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(54) Title: METHOD FOR BLOCKING THE USE OF A SERVICE IN A TELECOMMUNICATION SYSTEM



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(57) Abstract: The invention relates to a method and a system of controlling the use of a short message service in a telecommunication system comprising a telecommunication network (MNS), a terminal device (MS), by which the subscriber is connected to the aforementioned telecommunication network (MNS), a mobile services switching center (MSC) which is connected to the aforementioned telecommunication network (MNS), a gateway (GW) which is connected to the aforementioned telecommunication network (MNS), a short message service center (SMSC) which is connected to the aforementioned gateway (GW), a database (DB) which is connected to the aforementioned gateway (GW). In the invention, it is checked whether a short message is among non-allowed short messages. After the checking, the accepted short messages are directed to the gateway (GW). From the gateway (GW), a query is made by a database block (2) to the database inquiring whether the subscriber is entitled to send the short message.

**Method for blocking the use of a service in a telecommunication system**

The present invention relates to telecommunication technique.

5 In particular, the invention relates to a method of controlling the use of a short message service in a telecommunication system comprising a telecommunication network, a terminal device, by which the subscriber is connected to the telecommunication network, a mobile services switching center which is connected to the telecommunication network, a gateway which is connected to the telecommunication network and which comprises functions connected with the transmission of traffic, a short message service center which is connected to the gateway, a database which is connected to the gateway and to which subscriber information may be saved. The method in accordance with the invention enables one to block the transmission of short messages sent to a certain numerical space, containing a certain search word as well as a certain information content.

**BACKGROUND OF THE INVENTION**

Mobile communication networks, such as digital GSM networks (GSM, Global System for Mobile Communications), have become very popular in a big part of the world. The advantage of the mobile communication networks as compared to traditional fixed telephone networks is the air interface between the terminal device and the actual network that enables a wide-ranging mobility.

Since the introduction of the digital mobile networks, the services provided have included a short message service (SMS, Short Message Service). In the short message service, the user of a mobile station may send a short message that contains up to 160 char-

acters from his/her mobile station, e.g. to another user of a mobile station who has got a terminal device capable of receiving a short message. The short message is transmitted in an air interface outside the 5 actual speech time slots. This enables one to receive short messages, although there would be a call going on at the moment of receipt.

At present, the short messages have become very popular among the subscribers, and the operators 10 have developed a remarkable number of short messages for additional charges. This means in practice that a certain area is allocated from the numerical space for these services. Technically this means that separate analyses are generated in the short message service 15 center for these numbers. Based on these analyses, the short messages are transmitted further on.

The short message service has been activated for a certain subscriber or it has not been activated. At present, the transmission system of short messages 20 does not enable the blocking of short message service based on the B-subscriber number or certain search word.

The objective of the invention is to eliminate the problem referred to above. One specific objective of the invention is to disclose a new kind of 25 method and system that enable one to block the transmission of short messages addressed to a certain numerical space, containing a certain search word as well as a certain information content.

30

#### BRIEF DESCRIPTION OF THE INVENTION

In the background of the invention there is the idea that if one starts to merchandise short messages for additional charges, then some authorities of 35 the telephone traffic may require the building of a blocking service connected with them. In the same way as certain telephone numbers may be blocked, if re-

quired, also certain short messages would be blocked as well. The objective of the invention is to enable the required blocking.

The present invention is used for the controlling of the use of short message services as a functionality of the network in such a way that there is a SMS barring and a subscriber-specific database installed in the network. The database contains information on whether there is a blocking of transmission defined for a certain subscriber. If there is a blocking defined, then the SMS barring has to be able to judge, based on the information included in the database and on the destination number of the short message or on the possible search word included in it, whether the sending of a short message is allowed for the subscriber in question. If the subscriber is not entitled to use the aforementioned service, then the short message is not transmitted further on.

The invention relates to a method and a system of controlling a short message service in a mobile communication system comprising a telecommunication network, a terminal device, by which the subscriber is connected to the telecommunication network, a mobile services switching center which is connected to the telecommunication network, a gateway which is connected to the telecommunication network and which comprises functions connected with the transmission of traffic, a short message service center which is connected to the gateway, a database which is connected to the gateway and to which subscriber information may be saved. In addition, the system in accordance with the invention comprises a first and a second signal interface in the environment of the gateway. The operation of the gateway has been arranged so that the communication between the different network components via the first and second signal interface is possible.

In the method, a short message is created and the short message is sent as a short message to the telecommunication network. The short message is routed to the short message service center, in which the 5 short messages arrived are checked, i.e. whether they are among non-allowed short messages. From the short message service center, only those short messages are sent to the gateway that in response to the checking are among those that will be sent further on. After 10 this, it is checked in the database included in the gateway whether the subscriber is entitled to send the short message. In case it is stated, in response to the checking, that the transmission of the short message shall be blocked, then the transmission is 15 blocked and the subscriber is informed of the blocking of the transmission of the short message. This notification may be transmitted to the terminal device, e.g. by a short message or a USSD (Unstructured Supplementary Service Data) or by some other suitable mechanism. 20

In one embodiment of the invention, the short message is checked based on the destination number dialed by the subscriber. The short message may also be checked based on its text content.

25 The blocking definitions of a short message may be attached to the blocking information located in the home location register, defined by the operator.

In addition, the invention relates to a system of controlling the use of a short message service 30 in a telecommunication system comprising a telecommunication network, a terminal device, by which the subscriber is connected to the telecommunication network, a mobile services switching center which is connected to the telecommunication network, a gateway which is 35 connected to the telecommunication network and which comprises functions connected with the transmission of traffic, a short message service center which is con-

nected to the gateway, and a database which is connected to the gateway and to which subscriber information and different definitions may be saved.

In the system, a checking block is used to  
5 check, according to a first checking condition in the short message service center, whether the short message is among non-allowed short messages. After this,  
10 if the short message is among non-allowed short messages, then a database block is used to check, based on the blocking definitions, whether the subscriber is entitled to send the short message.

The aforementioned checking block is used to check the short message based on a second checking condition according to the destination number dialed  
15 by the subscriber, and the short message is checked based on a third checking condition according to the text content written by the subscriber.

In one embodiment of the system in accordance with the invention, the database is located in the mobile services switching center of the A-subscriber,  
20 the gateway or the short messages switching center, and the aforementioned components of the mobile communication system check the blocking definitions in the database. The database is an external or internal database.  
25

In one embodiment of the invention, the database is based on the functionality of the interface between the home location register and the visitor location register, in which case from the point of view  
30 of the operator of the home network, the home location register functions as the master database. The purpose is that when the mobile station moves over to the area of a certain mobile services switching center, the information about the blocking of the transmission of  
35 the short message is copied from the database to the visitor location register according to normal procedures of the GSM mobile communication system.

In one embodiment of the invention, there is a signalling block arranged in the gateway that is used to send the signals needed in the blocking of the transmission of a short message between the first and 5 the second interface.

In one embodiment of the system in accordance with the invention there is a saving block arranged in the system that is used to attach the blocking definitions of the short message to the blocking information 10 located in the home location register (HLR, Home Location Register), defined by the operator.

As compared to prior art, the invention provides the advantage that the shared use of modified databases and network elements enables one to control 15 the access rights of short message services based on the subscriber number or a search word.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the following section, the invention will 20 be described by the aid of a few examples of its embodiments with reference to the accompanying drawing, in which

Fig. 1 represents one advantageous system in accordance with the invention,

25 Fig. 2 is one advantageous signaling diagram illustrating the function of the present invention,

Fig. 3 is one advantageous flow chart illustrating the function of the present invention, and

30 Fig. 4 is one advantageous flow chart illustrating the function of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

The system as shown in Fig. 1 comprises a terminal device MS and a telecommunication network 35 MSN. In this example, the telecommunication network MSN is a mobile communication network. The terminal

device MS is preferably a mobile station. The mobile station MS is connected to the mobile communication network MSN by a radio interface. The system comprises, in addition, a mobile services switching center MSC, a short message service center SMSC, a gateway GW, a database DB. The mobile services switching center MSC is connected to the mobile communication network MSN and to the short message service center SMSC. The gateway GW is connected to the short message service center SMSC, and the database DB is connected to the gateway GW.

In the short message service center SMSC there is arranged a checking block 1 which is used to check, based on a first checking condition in the short message service center, whether the short message is among non-allowed short messages. The aforementioned checking block 1 is used to check the short message based on a second checking condition according to the destination number dialed by the subscriber. This is to find out whether the short messages are among the messages for additional charges. In addition, the checking block 1 is used to check the short message according to a third checking condition based on the text content written by the subscriber. In addition to the number, the user may have input a search word of the service in the text part of the short message, e.g. the word "balance". By the search word the subscriber may refer to number of services of different prices that have been grouped as being in different blocking classes.

The gateway GW means in this example a server computer in which there is a piece of software which supports the GSM system and the signaling protocols needed in it. The gateway GW comprises, among other things, the following components and facilities. It contains the databases for the saving of subscriber-specific information as well as the signaling compo-

nents , e.g. the SS7 (SS7, Signalling System number 7) for signaling, in which case the different signaling interfaces required by the communication may be matched.

5       The gateway GW comprises also the necessary software (e.g. the service creation, execution and management environment, descriptions of services). In addition, the gateway GW comprises the signaling protocols (INAP, MAP, TCAP, TCP/IP, SM-TP; in which INAP  
10 is the Intelligent Network Application Part, i.e. the protocol needed in the performing of applications between the networks, MAP is the Mobile Application Part, i.e. the network signaling of the GSM, TCAP is the Transaction Capabilities Application Part, TCP/IP  
15 is the Transmission Control Protocol, the Internet Protocol is the protocol needed in the controlling of data transfer and in the Internet transmission, and the SM-TP is the Short Message Transfer Protocol, i.e. the protocol needed in the transmission of short mes-  
20 sages.

In this example, the gateway GW is connected to the short message service center SMSC and to the database DB. The gateway GW receives the short message from the short message service center SMSC and analyzes the short message.  
25

From the point of view of the operator, the dialing of the subscriber contains significant identification information that is compared with the information included in the database of the gateway GW. After the aforementioned identification, the database block 2 of the gateway GW is used to check in the database DB, based on the blocking definitions, whether the subscriber is entitled to send the short message. In the invention there is a signaling block 3 arranged  
30 in the gateway GW that is used to send the signals needed in the blocking of the transmission of the  
35

short message between the first and the second signal interface, conforming to the aforementioned protocols.

It is also possible to define in the database DB protocols based on which the sending of the short message to the recipient (B-subscriber) is blocked. The recipient of the short message (B-subscriber) may also himself/herself define a blocking for one or more senders (A-subscriber). Based on the blocking, the transmission of short messages coming from the A-subscribers to the mobile station of the B-subscriber is blocked.

In the invention, the database DB is external or internal. The external database is e.g. a home location register HLR. In that case, the database DB is based on the functionality of the interface between the home location register HLR and the visitor location register VLR, in which case from the point of view of the operator of the home network, the home location register (HLR, Home Location Register) functions as the master database. In that case, the saving block 4 of the gateway GW is used to attach the blocking definitions of the short message to the blocking information located in the home location register HLR, defined by the operator. The aforementioned database DB is located in the mobile services switching center MSC, gateway GW or in the short message service center SMSC.

Fig. 2 is one advantageous signaling diagram illustrating the function of the present invention. The short message is sent from the terminal device MS1 to the mobile services switching center MSC, arrow 20. The short message is transmitted from the mobile service switching center MSC to the short message service center SMSC, arrow 21. The short message service center receives the short message, analyzes it and sends only those short messages to the gateway GW that based

on the analysis are among the short messages to be transmitted further on, arrow 22.

The gateway GW receives the short message and checks by a database query in the database DB whether 5 the subscriber is entitled to send the short message, arrow 23. At this point, the signaling block of the gateway GW takes care of the compatibility of the traffic between the first and the second signal interface SRP1,SRP2. The first signal interface SRP1 is 10 used to mean the interface between the gateway GW and the short message service center SMSC. The second signal interface SRP2 is used to mean the interface between the gateway GW and the database DB.

The database query of the gateway GW may be 15 made by using, e.g. a structured query language (SQL, Structured Query Language). In response to the database query the gateway GW gets the subscriber information back that shows whether the subscriber is entitled to send a short message or whether the transmission is blocked, arrow 24. If there is no blocking of 20 transmission defined for the subscriber, then the transmission is allowed, arrow 25. If the transmission is blocked, a notification of the blocking of the transmission is sent from the gateway GW to the mobile 25 services switching center MSC, arrow 26. This notification about the blocking of the transmission may be sent by a short message, USSD (Unstructured Supplementary Service Data) or by some other suitable mechanism.

30 Fig. 3 is one advantageous signaling diagram illustrating the function of the present invention. The A-subscriber sends a MO short message (MO, Mobile Originated) to the B-subscriber. The short message is transmitted to the short message service center SMS-C, 35 arrow 1. The short message service center SMS-C retrieves the routing information of the B-subscriber from the home location register HLR, e.g. by a SRI for

SMS message (SRI, Send Routing Info), arrow 2. The home location register HLR sends the address of the mobile services switching center in response to the query. In the home location register HLR there is the  
5 SMS blocking service activated based on the B-subscriber information. As a consequence of this, the home location register HLR does not return the address of the normal mobile services switching center, instead it returns the address of the gateway GW to the  
10 short message service center SMS-C, arrow 3. The short message sent by the A-subscriber is in this way directed to the gateway GW by a Forward SM MT message (MT, Mobile Terminated), arrow 4. The gateway GW does a search to the database DB based on the B-subscriber  
15 information, arrow 5. The database DB returns to the gateway GW the result of the fact of whether the A-subscriber information could be found on the list connected with the B-subscriber, arrow 6. If the A-subscriber information could be found on the list, the  
20 short message is not transmitted to the B-subscriber.

If the A-subscriber information could not be found on the list, the gateway GW sends a SRI for SM message to the gateway GW, arrow 7. By this message the gateway GW gets the routing information of the B-subscriber from the home location register HLR, arrow  
25 8. Instead of a SRI for SM message, also a SRI message may be used (SRI, Send Routing Info). If a SRI query was used for receiving the routing information from the home location register HLR, then the home location  
30 register HLR recognizes that the message comes from the gateway GW and returns the routing information of the B-subscriber to the gateway GW, arrow 8. Instead, if a SRI for SM message would be used, the home location register HLR would check whether to return the  
35 address of the gateway GW or the address of the right mobile services switching center. The fact of which one of the addresses is wanted may be shown, e.g. by

means of one bit. The gateway GW sends a Forward SM message to the mobile services switching center MSC, arrow 9. The mobile services switching center MSC transmits the short message further to the B-subscriber, arrow 10.

When the client orders a blocking service, the operator creates for the client an information field in the database DB. The client may also himself/herself add or eliminate telephone numbers from the blocking service. This may be done e.g. by way of a www user interface arranged for the client. In addition, the operation of the gateway GW may be provided with different functions connected with short messages. The blocking service may send a notification of a blocked short message to the sender of the short message, save the message for a later delivery, etc. The short message blocking service may concern normal subscriber numbers as well as service numbers.

Fig. 4 is one advantageous signaling diagram illustrating the function of the present invention. The A-subscriber sends a MO short message (MO, Mobile Originated) to the B-subscriber. The short message is transmitted to the short message service center SMS-C, arrow 1. The short message service center SMS-C retrieves the routing information of the B-subscriber from the home location register HLR, e.g. by a SRI for SMS message (SRI; Send Routing Info), arrow 2. In response to the query, the home location register HLR sends the address of the mobile services switching center MSC, arrow 3. The short message is transmitted in response to the query to the mobile services switching center MSC, arrow 4. Based on the user information of the B-subscriber, the mobile services switching center MSC is informed of the fact of whether there are any special measures to be taken for the short message traffic to be transmitted to the B-subscriber. The user information relating to the B-

subscriber is retrieved from the home location register HLR when the B-subscriber enters the area of the aforementioned mobile services switching center MSC. The user information of the B-subscriber is preferably 5 saved in the visitor location register VLR (VLR, Visitor Location Center) located in conjunction with the mobile services switching center MSC. In this example, there is the SMS blocking service activated in the user information of the B-subscriber. Because of this, 10 the short message is directed further to the gateway GW, arrow 5.

The gateway GW does a search to the database DB based on the B-subscriber information, arrow 6. The database DB returns to the gateway GW the result of 15 the fact of whether the A-subscriber information could be found on the list connected with the B-subscriber, arrow 6. If the A-subscriber information could be found on the list, the short message is not transmitted to the B-subscriber. If the A-subscriber information could not be found on the list, the gateway GW 20 returns the short message to the mobile services switching center MSC. The mobile services switching center MSC recognizes that the short message came from the gateway GW and transmits the short message further 25 to the B-subscriber, arrow 9.

In one embodiment of Fig. 3 or 4, client A does not want to receive short messages from her ex-boyfriend. The client determines in the services that 30 short messages coming from the telephone number of her ex-boyfriend are not transmitted to her. The client may herself determine the duration of the service.

In one embodiment of Fig. 3 or 4, client B does not want to receive short messages from his/her work colleagues during his/her vacation. The client 35 determines in the service all those telephone numbers for which s/he wishes to have the short message blocking. In that case, the client does not receive

short messages connected with work during his/her vacation. The short messages not transmitted may be saved to the service. The sender of the short message may also be notified of the fact that the short messages were not delivered to the recipient.

The invention is not restricted merely to examples of its embodiments, instead many variations are possible within the scope of the inventive idea.

**CLAIMS**

1. A method of controlling the use of a short message service in a telecommunication system comprising the steps of:
  - 5 routing the short message included in the terminal device to the short message service center (SMSC); and
  - transmitting the short message further to the destination number defined in it;
- 10 characterized in that the method further comprises the steps of:
  - checking before transmitting the short message whether the short message is among non-allowed short messages;
  - 15 if the short message belongs to the aforementioned group, then it is checked in the database (DB) whether the subscriber is entitled to send the short message,
  - 20 if in response to the aforementioned checking it is stated that the subscriber is not entitled to send the short message, then the transmission of the short message is blocked, and
  - the subscriber is notified of the blocking of the transmission of the short message.
- 25 2. The method according to claim 1, characterized in that the short message is checked according to the destination number dialed by the subscriber.
- 30 3. The method according to claim 1 or 2, characterized in that the short message is checked according to the text content written by the subscriber.
- 35 4. The method according to claim 1, 2 or 3, characterized in that the blocking definitions are attached to the blocking information located in the home location register (HLR), defined by the operator.

5. The method according to claim 1, 2, 3 or 4, characterized in that the recipient of the short message defines the senders the transmission of short messages sent by whom is blocked to the recipient.

6. The method according to claim 5, characterized in that the blocking definition of the transmission of short messages is done by way of the www user interface.

10 7. A system of controlling the use of a short message service in a telecommunication system comprising:

a telecommunication network (MSN) ;

15 a terminal device (MS) by which the subscriber is connected to the aforementioned telecommunication network (MSN) ;

a mobile services switching center (MSC) which is connected to the telecommunication network (MSN) ;

20 a gateway (GW) which is connected to the aforementioned telecommunication network (MSN) and which comprises functions connected with the transmission of traffic;

25 a short message service center (SMSC) which is connected to the aforementioned gateway (GW) ;

a database (DB) which is connected to the aforementioned gateway (GW) and to which subscriber information and different definitions have been saved;

30 characterized in that the system further comprises:

a checking block (1) which is used to check, based on a first checking condition, in the short message service center (SMSC) whether the short message is among non-allowed short messages; and

35 a database block (2) which is used to check in the database (DB) based on the blocking definitions

whether the subscriber is entitled to send the short message.

8. The system according to claim 7, characterized in that the aforementioned checking block (1) is used to check the short message, based on 5 a second checking condition, according to the destination number dialed by the subscriber.

9. The system according to claim 7 or 8, characterized in that the aforementioned 10 checking block (1) is used to check the short message, based on a third checking condition, according to its text content.

10. The system according to claim 7, characterized in that the database (DB) has 15 been arranged in the mobile services switching center (MSC), gateway (GW) or the short message service center (SMSC).

11. The system according to claim 7 or 10, characterized in that the database (DB) is 20 an external or internal database.

12. The system according to claim 7, 10 or 11, characterized in that the database (DB) is based on the functionality of the interface between the home location register (HLR) and the visitor location register (VLR), in which case from the point of view of the operator of the home network, the home location register (HLR) functions as the master database. 25

13. The system according to claim 7, 8, 9, 30 10, 11 or 12, characterized in that the gateway (GW) comprises a signaling block (3) which is used to send the signals needed in the blocking of the short messages between the first and the second signal interface (SRP1, SRP2).

35 14. The system according to claim 7, 10, 11, 12 or 13, characterized in that the system comprises a saving block (4) by which the blocking

definitions of the short message are attached to the blocking information located in the home location register (HLR), defined by the operator.

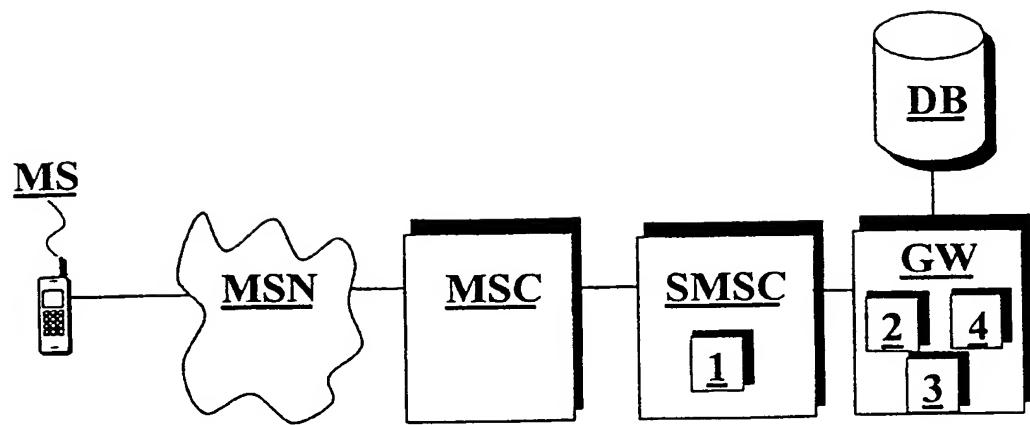


Fig. 1

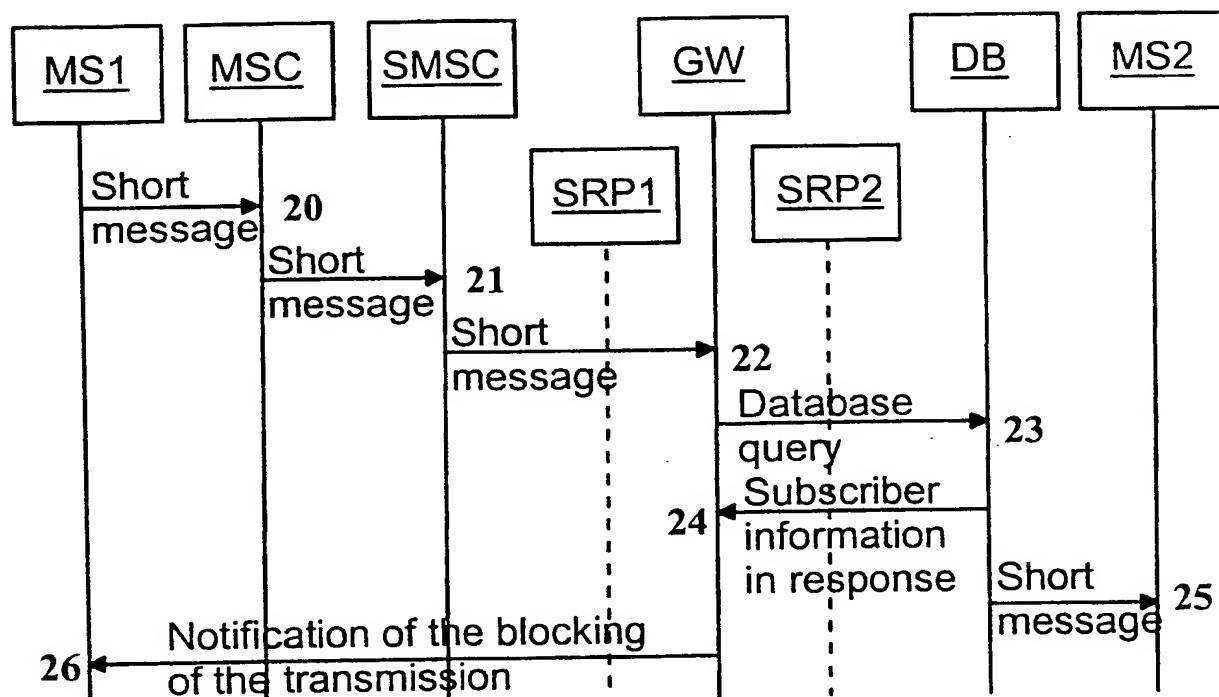


Fig. 2

2/2

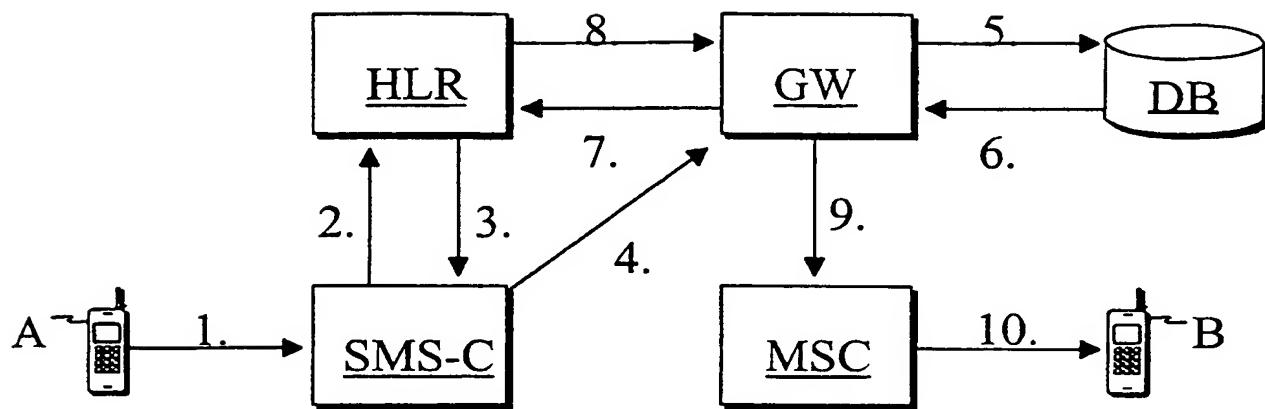


Fig. 3

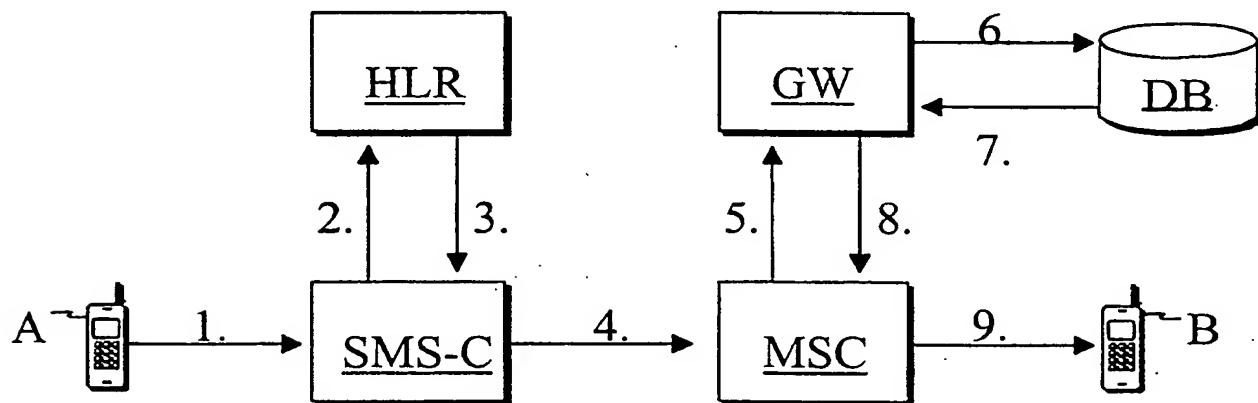


Fig. 4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 01/00354

## A. CLASSIFICATION OF SUBJECT MATTER

**IPC7: H04Q 7/22**

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

**IPC7: H04Q, H04M**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

**SE,DK,FI,NO classes as above**

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9927726 A1 (ERICSSON INC.), 3 June 1999 (03.06.99), page 4, line 15 - page 11, line 18, abstract	1-2,4-8, 10-14
Y	--	3,9
Y	WO 0042790 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 20 July 2000 (20.07.00), page 10, line 4 - page 11, line 25, abstract	3,9
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 Further documents are listed in the continuation of Box C. See patent family annex.

- \* Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

02/07/01

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PCT/FI 01/00354

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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